25 November 1958

TEST AND EVALUATION PROGRAM FOR THE LATCHING RADIO SWITCH SYSTEM

INTRODUCTION

The purpose of this program is to evaluate the system from the user's point of view under conditions which hopefully will represent both typical and extreme conditions of operational use. The results from the user type tests are to be used not only to determine the suitability of the system but also to develop useful operational information to aid the operator. The program also includes some tests to determine possible deleterious effects due to transportation conditions. Provision is also to be made in the program for laboratory tests to check the performance specifications of the units available, to check on possible manufacturing variations, and to check the reliability of such parts as the relay.

DESIRED OPERATIONAL INFORMATION

Battery life with full system under an on-off cycle and variation of sensitivity

Antenna recommendations for desired range and considerations in selection according to case.

Capability of relay contacts to carry load of various equipment

Vulnerability to damage due to wrong connections.

Detection possibilities

Irregular operation possibilities

Frequency drift (if any) and procedure for compensation

Reliability - any information & experience with failures

Ruggedness - handling precautions

PERFORMANCE UNDER POSSIBLE ENVIRONMENTAL EXTREMES AND AFTER EXPOSURE TO TRANSPORTATION AND STORAGE CONDITIONS

Life Test - high temperature and humidity
maximum input voltage
maximum environmental temperature
current flow through relay equipment
receiver
transmitter

Arrange for automatic periodic pulsing of transmitter and recording of relay position

Measure periodically tranmitter - frequency, output, pulse width; receiver - bandwidth, sensitivity, pulse width to evaluate results

Vibration

Units to be subjected to following while not operating:

550 CPM to 2700 CPM (displacement of) in increments of 300 CPM- each increment for one hour

Test for normal operation after above
Evaluate results.

Altitude and Low Temperature

Subject units to 40,000 ft., -65°F for 4 hours while not operating

Test for normal operation

Evaluate results

Rough Handling

Subject units to the condition of a rough ride on the body of a pick-up truck over a bad road for one hour

Test for normal operation

Evaluate results

Drop

Subject smaller units to a drop of four (4) feet onto concrete

Test for normal operation

Evaluate results

OPERATIONAL FIELD TESTS

Open Field

Vary antenna type and determine range for each with standard antenna height.

Vary direction of transmitter antenna and note effect

Evaluate results

City Building Operation

Select approximately four rooms (2 top of building, 2 bottom) at distances representing typical operational conditions

Operate various conbinations of transmitter, receiver locations

Vary antennas in above combinations

Vary transmitter power output

Long duration operation with recorder to record irregular operation

LABORATORY BENCH TESTS

Battery life with full system

Check of performance specifications

Receiver

Frequency
Sensitivity
Bandwidth
Dynamic range
Pulse width tolerance
Current draw

Transmitter

Frequency
Power Output
Pulse width

Effect of input voltage variation

Receiver - 7.5 - 0 volts

Frequency
Sensitivity
Bandwidth
Pulse width tolerance
Relay operation

Transmitter 125 - 0
250 - 0

Frequency
Power output
Pulse width

Vulnerability to damage due to wrong connections

Irregular operation possibilities

Operate a communication transmitter at same frequency and record any irregular operation